

# EXERCISES

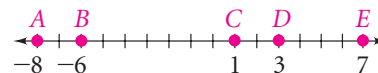
For more practice, see *Extra Practice*.

## Practice and Problem Solving

### A Practice by Example

Find the length of each segment. Tell whether the segments are congruent.

1.  $\overline{AC}$  and  $\overline{BD}$
2.  $\overline{BD}$  and  $\overline{CE}$
3.  $\overline{AD}$  and  $\overline{BE}$
4.  $\overline{BC}$  and  $\overline{CE}$



### Example 1 (page 26)

On a number line, the coordinates of  $X$ ,  $Y$ ,  $Z$ , and  $W$  are  $-7$ ,  $-3$ ,  $1$ , and  $5$ , respectively. Compare the lengths of the two segments.

5.  $\overline{XY}$  and  $\overline{ZW}$
6.  $\overline{ZX}$  and  $\overline{WY}$
7.  $\overline{YZ}$  and  $\overline{XW}$

### Example 2 (page 26)

Use the figure at the right for Exercises 8–11.

8. If  $RS = 15$  and  $ST = 9$ , then  $RT = \square$ .



9. If  $ST = 15$  and  $RT = 40$ , then  $RS = \square$ .

10. a. **Algebra** If  $RS = 3x + 1$ ,  $ST = 2x - 2$ , and  $RT = 64$ , find the value of  $x$ .  
b. Find  $RS$  and  $ST$ .

11. a. **Algebra** If  $RS = 8y + 4$ ,  $ST = 4y + 8$ , and  $RT = 15y - 9$ , find the value of  $y$ .  
b. Find  $RS$ ,  $ST$ , and  $RT$ .

12. **Algebra**  $A$  is the midpoint of  $\overline{XY}$ .  
a. Find  $XA$ .  
b. Find  $AY$  and  $XY$ .

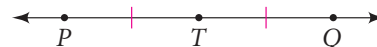


13. **Algebra** In Exercises 13–15, use the figure and find  $PT$ .

13.  $PT = 5x + 3$  and  $TQ = 7x - 9$

14.  $PT = 4x - 6$  and  $TQ = 3x + 4$

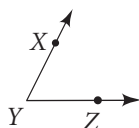
15.  $PT = 7x - 24$  and  $TQ = 6x - 2$



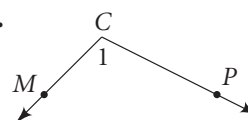
### Example 4 (page 27)

Name each angle in three ways.

- 16.



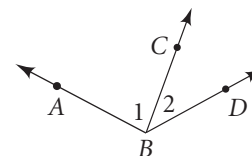
- 17.



Use the figure at the right. Name the indicated angle in two different ways.

18.  $\angle 1$

19.  $\angle 2$



### Example 5 (page 28)

Draw and label a figure to fit each description.

20. an obtuse angle,  $\angle RST$

21. an acute angle,  $\angle BCD$

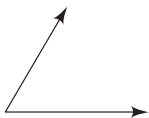
22. a straight angle,  $\angle EFG$

23. a right angle,  $\angle GHI$

**Example 3**  
(page 27)

Measure and classify each angle.

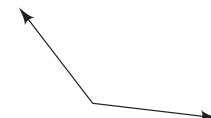
24.



25.

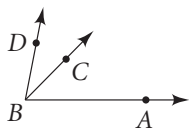


26.

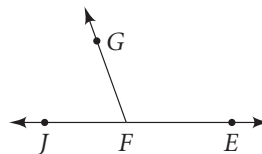


**Example 6**  
(page 29)

27. Find  $m\angle CBD$  if  $m\angle ABC = 45$  and  $m\angle ABD = 79$ .



28. Find  $m\angle GFJ$  if  $m\angle EFG = 110$ .



**B Apply Your Skills**

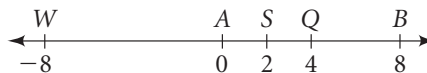
Use the figure at the right for Exercises 29–32.

29. Find the midpoint of  $\overline{AB}$ .

30. What is the coordinate of the midpoint of  $\overline{QB}$ ?

31. What is the coordinate of the midpoint of  $\overline{WA}$ ?

32. What is the coordinate of the midpoint of the segment formed by the two points you found in Exercises 30 and 31?



Suppose the coordinate of A is 0 and  $AR = 5$  and  $AT = 7$  in the figure above. What are the possible coordinates of the midpoint of the given segment?

33.  $\overline{AR}$

34.  $\overline{AT}$

35.  $\overline{RT}$

- 36. Mileage** Highways and the mile markers along their sides suggest a number line. You can find the distance between mile markers in the same way that you find distance on a number line.
- Michael sees mile marker 237 when he enters the highway and mile marker 159 when he exits. How far did he travel?
  - Open-Ended** Give another real example of finding distance using a number line.

**Visualization** Without using your ruler, sketch a segment with the given length. Then use your ruler to see how well you did. .

37. 3 cm

38. 3 in.

39. 6 in.

40. 10 cm

41. 65 mm

In Exercises 42–45, describe the statement as *true* or *false*. Explain.

42.  $\overline{AB} \cong \overline{CD}$

43.  $BD < CD$

44.  $AC + BD = AD$

45.  $AC + CD = AD$

46. Suppose  $EG = 5$ . Find the possible coordinate(s) of point G.



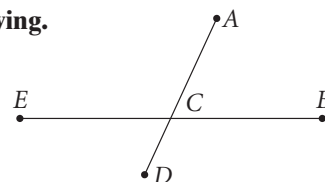
Exercises 42–46

In the diagram,  $m\angle ACB = 65$ . Find each of the following.

47.  $m\angle BCD$

48.  $m\angle ECD$

49. **Coordinate Geometry** A(3, 0) is an endpoint of  $\overline{AB}$ . If  $AB = 12$ , give four possible coordinates for point B.



Exercises 47–48



**Need Help?**

For Exercise 43 you are to decide whether the distance  $BD$  is less than the distance  $CD$ .

**Visualization** Without using your protractor, sketch an angle with the given measure. Then use your protractor to see how well you did.

50. 45      51. 60      52. 90      53. 120      54. 135

55. **Skiing** Use a protractor on the photograph to measure the angle formed by the two skis.



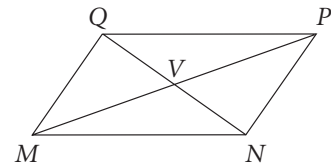
**Open-Ended** Name two times of the morning when the hands of a clock form each type of angle.

56. right      57. obtuse      58. straight

**Estimation** Estimate the measure of the angle formed by the hands of a clock at each time.

59. 6:00      60. 7:00      61. 11:00  
62. 4:40      63. 5:20      64. 10:40

Use this figure for Exercises 65–69.

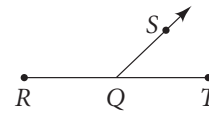


65. If  $m\angle MQV = 90$  and  $m\angle VQP = 35$ , what is  $m\angle MQP$ ?  
66. If  $m\angle MVQ = 55$ , what is  $m\angle QVP$ ?

**Judging by appearance in the diagram above, name each of the following.**

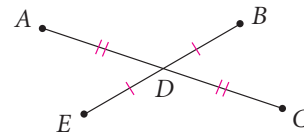
67. two acute angles      68. two obtuse angles      69. two right angles


- x<sup>2</sup>** 70. **a. Algebra** Solve for  $x$  if  $m\angle RQS = 2x + 4$  and  $m\angle TQS = 6x + 20$ .  
**b.** What is  $m\angle RQS$ ?  $m\angle TQS$ ?  
**c.** Show how you can check your answer.




**x<sup>2</sup>** **Algebra** Use the diagram at the right for Exercises 71 and 72.

71. If  $AD = 12$  and  $AC = 4y - 36$ , find the value of  $y$ . Then find  $AC$  and  $DC$ .  
72. If  $ED = x + 4$  and  $DB = 3x - 8$ , find  $ED$ ,  $DB$ , and  $EB$ .



-  73. **Writing** The word *acute* can mean “sharp” in conversational English.  
**a.** Explain why this meaning describes an acute angle.  
**b.** Use “acute” in a sentence.

-  74. **Flower Arranging** In Japanese flower arranging, you match a stem that is vertical with 0. You match other stems with numbers from 0 to 90, in both directions from the vertical. What numbers would the flowers shown be paired with on a standard protractor?



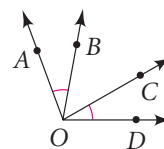
**$x^2$  Algebra** Use the diagram, below right, for Exercises 75–78. Solve for  $x$ . Find the angle measures to check your work.

75.  $m\angle AOC = 7x - 2$ ,  $m\angle AOB = 2x + 8$ ,  
 $m\angle BOC = 3x + 14$

76.  $m\angle AOB = 4x - 2$ ,  $m\angle BOC = 5x + 10$ ,  
 $m\angle COD = 2x + 14$

77.  $m\angle AOB = 28$ ,  $m\angle BOC = 3x - 2$ ,  $m\angle AOD = 6x$

78.  $m\angle AOB = 4x + 3$ ,  $m\angle BOC = 7x$ ,  $m\angle AOD = 16x - 1$

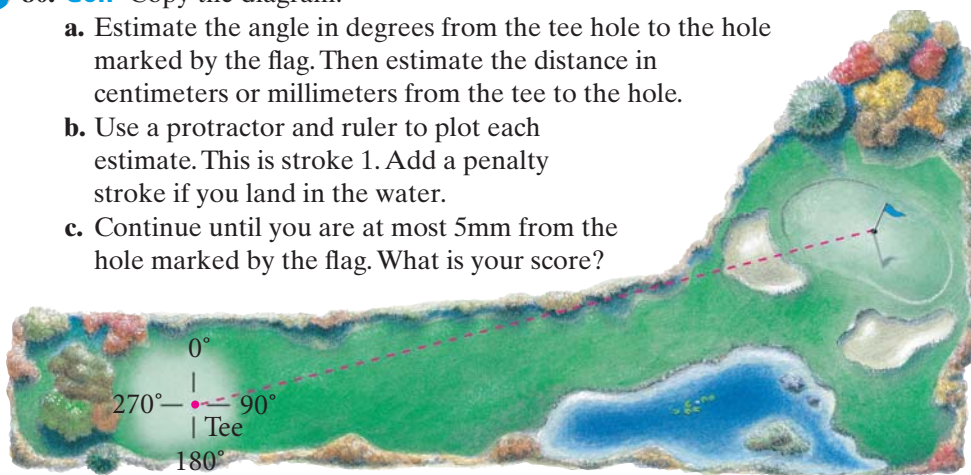


**Challenge**

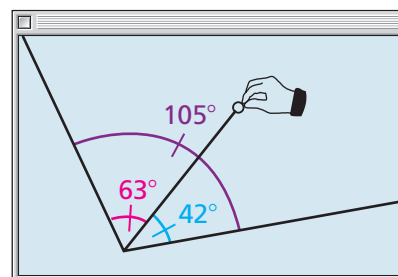
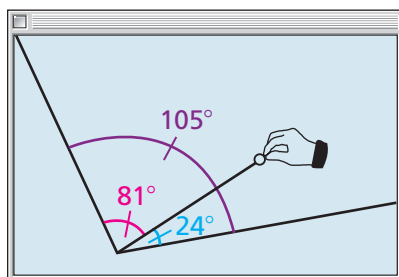
79.  $C$  is the midpoint of  $\overline{AB}$ ,  $D$  is the midpoint of  $\overline{AC}$ ,  $E$  is the midpoint of  $\overline{AD}$ ,  $F$  is the midpoint of  $\overline{ED}$ ,  $G$  is the midpoint of  $\overline{EF}$ , and  $H$  is the midpoint of  $\overline{DB}$ . If  $DC = 16$ , find  $GH$ .

**80. Golf** Copy the diagram.

- Estimate the angle in degrees from the tee hole to the hole marked by the flag. Then estimate the distance in centimeters or millimeters from the tee to the hole.
- Use a protractor and ruler to plot each estimate. This is stroke 1. Add a penalty stroke if you land in the water.
- Continue until you are at most 5mm from the hole marked by the flag. What is your score?



81. **Technology** Leon constructed an angle. Then he constructed a ray from the vertex of the angle to a point in the interior of the angle. He measured all the angles formed. Then he moved the interior ray. What postulate do the two pictures support?





## Standardized Test Prep

### Multiple Choice



### Take It to the NET

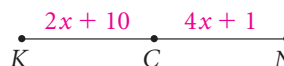
Online lesson quiz at  
[www.PHSchool.com](http://www.PHSchool.com)

Web Code: afa-0104

### Short Response

82. If  $KC = 31$ , what is  $KN$ ?

- A. 43                      B. 62  
C. 74                      D. 82



Exercises 82–84

83. If  $KN = 29$ , what is  $CN$ ?

- F. 13                      G. 14.5                      H. 15.5                      I. 16

84. If  $C$  is the midpoint of  $\overline{KN}$ , what is  $KC$ ?

- A. 4.5                      B. 9                      C. 18                      D. 19

85. When 15 is subtracted from the measure of an angle, the result is the measure of a right angle. What is the measure of the original angle?

- F. 75                      G. 85                      H. 105                      I. 115

86. You are given that  $m\angle ABD + m\angle DBC = m\angle ABC$ .

- a. Draw a diagram to show the above.  
b. If  $m\angle ABD = 12$  and  $\angle ABC$  is obtuse, what are the least and greatest whole number measures possible for  $\angle DBC$ ? Explain.

## Mixed Review

### Lesson 1-3

Complete each statement with *always*, *sometimes*, or *never* to make a true statement.

87. Skew lines are ? coplanar.                      88. Skew lines ? intersect.  
89. Opposite rays ? form a line.                      90. Parallel planes ? intersect.

### Lesson 1-2

91. Three points are ? coplanar.  
92. Two points are ? collinear.  
93. The intersection of two planes is ? a line.  
94. Intersecting lines are ? parallel.

### Lesson 1-1

Find the next two terms in each sequence.

95. 5, 10, 15, 20, ...                      96. 5, 25, 125, 625, ...                      97. 14, 18, 22, 26, ...